



DECLARATION

I, the undersigned, declare and state that I am well versed both in English and Japanese languages and that the annexed English translation corresponds in its contents exactly to the Japanese language specification and claims filed in the Japanese Patent Office on the 18th day of October, 2002 under the Patent Application No. 2002-304965.

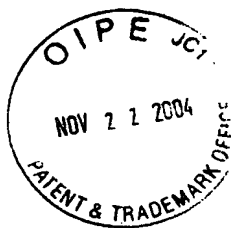
This 29th day of September, 2004.

Signed by

A handwritten signature in black ink, appearing to read "Yoshiharu Shirahama", written over a horizontal line.

Yoshiharu Shirahama

(Japanese Patent Attorney)



(TRANSLATION)

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This is to certify that the annexed is a true copy of the following application as filed with this Office.

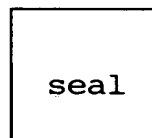
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(TRANSLATION)

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[Title of the Invention]	PACKAGED ASSEMBLY CONSISTING OF PACKAGE AND A PLURALITY OF DIAPERS ORDERLY PACKED THEREIN
[Number of Claims]	5
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Patent Application No. 2002-304965

[Submitted Documents]

[Name of Document]	Specification	1 copy
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[Name of Document]	Drawings	1 set
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[Name of Document]	Abstract	1 copy
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General Power of Attorney] 9904036

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[Name of Document] SPECIFICATION

[Title of the Invention] PACKAGED ASSEMBLY CONSISTING OF
PACKAGE AND A PLURALITY OF DIAPERS
ORDERLY PACKED THEREIN

[Claims]

[Claim 1] A packaged assembly comprising a package formed of a flexible sheet substantially in a rectangular hexahedron having first through sixth surfaces, each pair of the adjacent surfaces being substantially orthogonal to each other and a plurality of pants-type disposable diapers, each including front and rear waist regions opposed to and connected with each other along waists' lateral portions or these front and rear waist regions extending in a longitudinal direction in the vicinity of marginal edges thereof so as to form a waist-hole and a pair of leg-holes wherein each of said diapers a waist's end portion surrounding said waist-hole and a crotch region's bottom lying below said leg-holes and wherein said plurality of diapers are densely packed within said package so that said plurality of disposable diapers may have the respective waist regions placed in close contact one with another between opposed inner surfaces of said package, said packaged assembly being characterized by that:

each of said diapers is provided with a pair of imaginary

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fold-guiding lines each bifurcating from a transversely middle zone toward higher points of the associated leg-hole so that both lateral portions of said crotch region's bottom may be folded inwardly of said diaper along said first fold-guiding lines; and

said package contains therein first diapers each having said waist's end portion lying on the side of said first surface of said package with respect to said crotch region's bottom and second diapers each having said waist's end portion lying on the side of said second surface of said package opposed to said first surface with respect to said crotch region's bottom so that said first and second diapers are alternately placed in close contact one with another to form a row in which the number of said first diapers is substantially equal to the number of said second diapers.

[Claim 2] The packaged assembly according to Claim 1, wherein each of said diapers comprises a liquid-pervious topsheet facing the wearer's skin, a liquid-impervious backsheet facing away from the wearer's skin and a liquid-absorbent core interposed between said top- and backsheets and extending between said front and rear waist regions and wherein each of said diapers is further provided with a pair of imaginary second fold-guiding lines extending

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in said waist's lateral portions in the longitudinal direction immediately outside transversely opposite side edges of said core so that said waist's lateral portions of said diaper may be folded inwardly of said diaper.

[Claim 3] The packaged assembly according to Claim 1 or 2, wherein a difference between the number of said first diapers and the number of said second diapers is in a range of 0 to ± 3 .

[Claim 4] The package assembly according to Claim 1 through 3, wherein said package contains therein at least two of said rows placed upon each other in a vertical direction.

[Claim 5] The packaged assembly according to any one of Claims 1 through 4, wherein said package contains therein at least two of said rows arranged side by side.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

This invention relates to a packaged assembly consisting of a package and a plurality of disposable diapers orderly packed within the package so that these diapers may be placed one upon another.

[0002]

[Related Art]

As an example of the packaged assembly consisting of a

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package and a plurality of pants-type disposable diapers each comprising a liquid-pervious topsheet, a liquid-impervious backsheet and a liquid-absorbent core disposed between these two sheets, the packaged assembly is well known in which the diapers are packed within the package so as to be placed one upon another in back and forth direction with front and rear waist regions of each pair of the adjacent diapers being opposed to each other (See PATENT DOCUMENT 1) Within the package, each of the diapers arranged in such manner to form a row has its waist's end portion lying on the side of the package's top surface and its crotch region's bottom lying on the side of the package's bottom surface.

[0003]

In most of the disposable diaper, the liquid-absorbent core does not extend to the waist-surrounding end portions of the front and rear waist regions and therefore the remaining portion of the diaper except the waist-surrounding end portions has a thickness larger than that of those waist-surrounding end portions. Particularly when the crotch regions' lower ends of the respective diapers are folded toward the respective rear waist regions to pack the diapers in the case of the above-cited PATENT DOCUMENT 1, the thickness of the remaining portions except the waist-surrounding end portions will be remarkably

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larger than the thickness of these waist-surrounding end portions.

[0004]

[Patent Document 1]

Japanese Laid-Open Patent Application Gazette No.
2000-42028

[0005]

[PROBLEM TO BE SOLVED BY THE INVENTION]

According to the packaged assembly as disclosed in Patent Document 1, a total thickness of a row formed by a plurality of diapers placed one upon another in back and forth direction is larger on the package's bottom space than on the side of the package's top surface. In other words, even if the diapers are packed so as to occupy the maximum dimension in back and forth direction of the package on the side of the package's bottom surface, a gap will be left between each pair of the adjacent waist-surrounding end portions of the diapers and efficiency for packing the diapers into the package will be deteriorated. Furthermore, such packaged assembly of prior art is inconvenient in that the waist's end portions of the diaper lying on the side of the package's top surface are readily bent when a plurality of the packages are stacked in the vertical direction. Consequently, a stability of such stack can not be

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expected and there is an anxiety that such stack of the packages might unintentionally collapse.

[0006]

In addition, when two or more rows of the diapers are stacked within one and same package, the upper row of the diapers may flatten or collapse the waist-surrounding end portions of the diapers forming the lower row and form these waist-surrounding end portions of the diapers with a plurality of irregular wrinkles.

[0007]

In view of the problems as have been described above, it is a principal object of this invention to provide a packaged assembly consisting of a package and a plurality of disposable diapers efficiently packed in a package without an anxiety that the packages might unintentionally collapse even when two or more packages are stack in the vertical direction.

[0008]

[Measure to Solve the Problem]

The object set forth above is achieved, according to the present invention, by an improvement in the packaged assembly comprising a package formed of a flexible sheet substantially in a rectangular hexahedron having first through sixth surfaces, each pair of the adjacent surfaces being substantially

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orthogonal to each other and a plurality of pants-type disposable diapers, each including front and rear waist regions opposed to and connected with each other along waists' lateral portions or these front and rear waist regions extending in a longitudinal direction in the vicinity of marginal edges thereof so as to form a waist-hole and a pair of leg-holes wherein each of these diapers a waist's end portion surrounding the waist-hole and a crotch region's bottom lying below the leg-holes and wherein the plurality of diapers are densely packed within the package so that the plurality of disposable diapers may have the respective waist regions placed in close contact one with another between opposed inner surfaces of the package.

[0009]

The improvement according to the present invention is characterized by that each of these diapers is provided with a pair of imaginary fold-guiding lines each extending in V-shape from a transversely middle zone toward upper points of the leg-holes so that both lateral portions of the crotch region's may be folded inwardly of the diaper along the first fold-guiding lines, and the package contains therein first diapers each having the waist's end portion lying on the side of the first surface of the package with respect to the crotch

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region's bottom and second diapers each having the waist's end portion lying on the side of the second surface of the package opposed to the first surface with respect to the crotch region's bottom so that the first and second diapers are alternately placed in close contact one with another to form a row in which the number of the first diapers is substantially equal to the number of the second diapers.

[0010]

According to one preferred embodiment of the present invention, each of these diapers comprises a liquid-pervious topsheet facing the wearer's skin, a liquid-impervious backsheet facing away from the wearer's skin and a liquid-absorbent core interposed between the top- and backsheets and extending between the front and rear waist regions and each of these diapers is further provided with a pair of imaginary second fold-guiding lines extending in the waist's lateral portions in the longitudinal direction immediately outside transversely opposite side edges of the core so that the waist's lateral portions of the diaper may be folded inwardly of the diaper.

[0011]

According to another preferred embodiment of the present invention, a difference between the number of the first diapers

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and the number of the second diapers is in a range of 0 to ± 3 .

[0012]

According to still another preferred embodiment of the present invention, the package contains therein at least two of the rows placed upon each other in a vertical direction.

[0013]

According to further another preferred embodiment of the present invention, the package contains therein at least two of the rows arranged side by side.

[0014]

[Detailed Description of the Preferred Embodiments]

Details of the packaged assembly according to this invention will be more fully understood from the description given hereunder in reference with the accompanying drawings.

[0015]

Fig. 1 is a perspective view showing a package 1A as partially broken away, Fig. 2 is a side view showing the package 1A with a third side wall 2e broken away, Fig. 3 is a perspective view showing the individual diaper 10 taken out from the package 1A and Fig. 4 is a developed plan view showing the diaper 10 of Fig. 3 as front and rear waist regions disconnected from each other along respective waist's lateral portions 20. In Figs. 1 and 2, a transverse direction is indicated by an arrow X, a

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forward direction as viewed in back-and-forth direction of the package 1A, a backward direction as viewed in the back-and-forth direction is indicated by an arrow Y2 and a vertical direction is indicated by an arrow Z. In Figs. 3 and 4, a waist-surrounding direction is indicated by an arrow L1 (in Fig. 3 alone), a width direction is indicated by an arrow L2, a longitudinal direction is indicated by an arrow M, and a leg-surrounding direction is indicated by an arrow N (in Fig. 3 alone).

[0016]

This packaged assembly comprises the package 1A having a hexahedral shape of which each pair of adjacent surfaces are substantially orthogonal to each other and the pants-type disposable diapers 10 orderly packed within the package 1A. In this packaged assembly, a plurality of the diapers 10 are densely packed within the package 1A so as to placed one upon another in the back-and-forth direction (one direction) under a compression in this back-and-forth direction. Within this package 1A, ten diapers 10 are placed one upon another in the back-and-forward direction to form a row G and a pair of such rows G are placed side by side. Another pair of rows G placed side by side are stacked on the former pair of rows G. Thus a total of four rows G are packed within the package 1A.

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[0017]

The package 1A is formed by a flexible sheet and presents a substantially regular hexahedron which is relatively long in the back-and-forth direction. The package 1A is contoured by vertically opposed substantially rectangular top surface (first surface) 2a and bottom surface (second surface) 2b, substantially rectangular first lateral surface (third surface) 2c and second lateral surface (fourth surface) 2d opposed to each other in the back-and-forth direction and transversely opposed substantially rectangular third lateral surface (fifth surface) 2e and fourth lateral surface (sixth surface) 2f. These lateral surfaces 2c, 2d, 2e, 2f respectively have extended surfaces 2g rising upward from longitudinally opposite ends and transversely opposite side edges of the top surfaces 2a. The extended surfaces 2g associated with the third and fourth lateral surfaces 2e, 2f are provided with a pair of handling straps 3 describing circular arcs which are convex toward above the package 1A. A corner 4 along which the first lateral surface 2c and the third lateral surface 2e intersect with each other is formed with perforations 5 arranged in the vertical direction as indicated by imaginary lines in Fig. 1. In the case of the package 1A, a region 6 surrounded by the perforations 5 so as to extend over parts of the first lateral

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surface 2c and the third lateral surface 2e may be torn off from the package 1A to form this corner 4 with a dispensing port for the individual diapers 10.

[0018]

The diaper 10 comprises a liquid-impervious outer sheet 12 and a liquid-absorbent panel 11 placed on the inner side of the outer sheet 12. The diaper 10 has a front waist region 16 and a rear waist region 17 opposed to each other. In the diaper 10, the front and rear waist regions 16, 17 are put flat together along transversely opposite lateral portions 20 of thereof extending in the longitudinal direction and bonded together in the vicinity of respective marginal edges of these lateral portions 20 by means of a plurality of welding lines 22 arranged intermittently in the longitudinal direction. The diaper 10 is formed with a waist-hole 23 and a pair of leg-holes 24. The diaper 10 has waist-surrounding end portions 18 extending in waist-circumferential direction to surround the waist-hole 23, leg-surrounding lateral portions 21 extending in leg-circumferential direction to surround the respective leg-holes 24 and a crotch region's bottom 19 lying below the leg-holes 24.

[0019]

The outer sheet 12 (liquid-impervious backsheet) has an

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area larger than that of the panel 11 and presents a substantially hourglass-like planar shape. The outer sheet 12 comprises two hydrophobic fibrous nonwoven fabric layers 26, 27 placed upon each other. The panel 11 comprises, as will be seen in Figs. 3 and 4, a rectangular liquid-pervious sheet 13 (liquid-pervious topsheet) facing wearer's skin, a rectangular liquid-impervious sheet 14 (liquid-impervious backsheet) facing away from wearer's skin and a liquid-absorbent core 15 interposed between these two sheets 13, 14 and bonded to respective inner surfaces of these sheets 13, 14. The sheets forming the panel 11 are bonded to the nonwoven fabric layers 26, 27 forming the outer sheet 12 by means of adhesive (not shown). The core 15 extends from the crotch region's bottom 19 toward the waist-surrounding end portions 18. In the diaper 10, the core 15 is absent in the waist-surrounding end portions 18 and, in consequence, a thickness of the diaper 10 is larger in the region except the waist-surrounding end portions 18 than in the waist-surrounding end portions 18.

[0020]

The diaper 10 is formed with a pair of first fold-guiding lines 30 each bifurcating from a transversely middle zone of the crotch region's bottom 19 toward higher points of the associated leg-hole 24. As shown in Fig. 4, each of the first

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fold-guiding lines 30 substantially describes a V-shape extending between the transversely middle zone of the crotch region's bottom 19 and the marginal edge of the associated leg-surrounding lateral portion 21. Both lateral portions of the crotch region's bottom 19 are folded along the first fold-guiding lines 30 inwardly of the diaper 10.

[0021]

In this packaged assembly, the first diapers 10A each having the waist-surrounding end portions 18 lying on the side of the top surface 2a of the package 1A with respect to the crotch region's bottom 19 and the second diapers 10B each having the waist-surrounding end portions 18 lying on the side of the bottom surface 2b of the package 1A with respect to the crotch region's bottom 19 are alternately placed one upon another in the back-and-forth direction in the row G within the package 1A. The row contains five of the first diaper 10A and five of the second diaper 10B. Thus, the number of the first diapers 10A is equal to the number of the second diapers 10B in the row G. In the row G, from the front side toward the backside in the back-and-forth direction, the front waist region 16 of the second diaper 10B lying immediately behind the first diaper 10A is placed against the rear waist region 17 of this first diaper 10A and the front waist region 16 of the first diaper 10A lying

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immediately behind this second diaper is placed against the rear waist region 17 of this second diaper 10B.

[0022]

In the case of this packaged assembly, the first diapers 10A and the second diapers 10B are alternately placed against one another and the number of the first diapers 10A is equal to the number of the second diapers 10B in the row G. Such construction of the row G advantageously ensures that the thickness of the row G in the back-and-forth direction has substantially no difference between its upper half and lower half in spite of the fact that, both in the first diapers 10A and in the second diapers 10B, the thickness of the region except the waist-surrounding end portions 18 are larger than the thickness of the trunk-surrounding end portion 15. Even when the diapers 10 are packed within the package 1A to fill the maximum dimension of the package 1A in the back-and-forth direction, no gap is formed between each pair of the adjacent diapers 10 both in the upper half and in the lower half of the row G and thereby a packing efficiency for the diapers 10 within the package 1A can be improved.

[0023]

In this packaged assembly, there is substantially no gap between each pair of the adjacent diapers 10 both in the upper

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half and in the lower half of the row G, so the stability required when a plurality of the packages 1A are stacked in the vertical direction is reliably ensured. In other words, the overlying package 1A is reliably supported by the underlying package 1A and it is not apprehended that the stack of these packages 1A might unintentionally collapse.

[0024]

In this packaged assembly, the first diapers 10 and the second diapers 10B are alternately placed against one another in the back-and-forth direction without leaving any gap and it is not apprehended that the waist-surrounding end portions 18 of the respective diapers 10 might be readily bent. Such manner of packaging allows two rows G of the diapers 10 to be stacked in the vertical direction without the anxiety that the upper row G of the diapers 10 might flatten or collapse the waist-surrounding end portions 18 of the diapers 10 in the underlying row G and these waist-surrounding end portions 18 of the diapers 10 might be formed with irregular wrinkles even when two rows G of the diapers 10 are stacked in the vertical direction within one and same package 1A.

[0025]

The panel 11 has longitudinally opposite end portions 11a extending in the transverse direction and transversely opposite

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side edge portions 11b extending in the longitudinal direction. The end portions 11a of the panel 11 are defined by portions of the sheets 13, 14 extending outward beyond longitudinally opposite ends 15a of the core 15. Along the end portions 11a of the panel 11, the sheets 13, 14 are put flat together and have respective inner surfaces bonded together. The side edge portions 11b of the panel 11 are defined by portions of the sheet 13, 14 extending outward beyond the side edges 15b of the core 15. Along the side edge portions 11b of the panel 11, the sheets 13, 14 are put flat together and have respective inner surfaces bonded together. In the vicinity of the waist-surrounding end portions 18, the side edge portions 11b of the panel 11 are folded back inwardly of the diaper 10 and bonded to the end portions 11a, respectively. Elastic members 29b extending in the longitudinal direction are attached to the side edge portions 11b of the panel 11 so that these elastic members 29b can contract in the longitudinal direction. The elastic members 29b are interposed between the sheets 13, 14 and bonded to respective inner surfaces of these sheets 13, 14.

[0026]

The waist-surrounding end portions 18 are defined by portion of the outer sheet 12 extending outward in the longitudinal direction beyond the longitudinally opposite end

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portions 11a of the panel 11. A plurality of waist-surrounding elastic members 28 extending in waist-circumferential direction are attached to the waist-surrounding end portions 18 so that these elastic members 28 can contract in the waist-circumferential direction. These waist-surrounding elastic members 28 are interposed between the nonwoven fabric layers 26, 27 and bonded to these nonwoven fabric layers 26, 27. The waist's lateral portions 20 are defined by portion of the outer sheet 12 extending outward in the transverse direction beyond the side edge portions 11b of the panel 11.

[0027]

The leg-surrounding lateral portions 20 are defined by the side edge portions 11b of the panel 11 and the outer sheet 12. A plurality of leg-surrounding elastic members 29a extending in leg-circumferential direction are attached to the leg-surrounding lateral portions 21 so that these elastic members 29a can contract in this leg-circumferential direction. The leg-surrounding elastic members 29a are interposed between the nonwoven fabric layers 26, 27 and bonded to these nonwoven fabric layers 26, 27.

[0028]

To obtain the diaper 10 of Fig. 3 from the state shown by Fig. 4 in a plan view, the diaper 10 is folded in two along

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the crotch region's bottom 19 with the topsheet 13 inside so that the front and rear waist regions 16, 17 may be opposed to each other, then the front and rear waist regions 16, 17 are bonded together in the vicinity of the marginal edges of the respective waist's lateral portions 20 and finally the both leg-surrounding lateral portions 21 are folded along the first fold-guiding lines 30 inwardly of the diaper 10.

[0029]

Though not illustrated, the elastic members 29a contract as the diaper 10 is shaped in the pants-type and, in consequence, the side edge portions 11b of the panel 11 rise on the topsheet. In this way, the side edge portions 11b of the panel 11 form barriers adapted to prevent bodily discharges from leaking outward beyond the side edge portions 11b of the panel 11.

[0030]

Fig. 5 is a perspective view showing the package 1B according to another embodiment as partially broken away, Fig. 6 is a perspective view showing the single diaper 10 taken out from the package 1B and Fig. 7 is a developed plan view showing the diaper 10 of Fig. 6 as the waist's lateral portions 20 have been disconnected from each other. In Fig. 5, a transverse direction is indicated by an arrow X, a forward direction as viewed in the back-and-forth direction is indicated by an arrow

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Y1, a backward direction as viewed in the back-and-forth direction is indicated by an arrow Y2 and a vertical direction is indicated by an arrow Z. In Figs. 6 and 7, a waist-surrounding direction is indicated by an arrow L1 (in Fig. 6 alone), a transverse direction is indicated by an arrow L2 and a longitudinal direction is indicated by an arrow M.

[0031]

Similarly to the package 1A shown by Fig. 1, the packages 1B is formed of a flexible sheet substantially in a regular hexahedron which is relatively long in the back-and-forth direction, in which each pair of adjacent surfaces are substantially orthogonal to each other. The diaper 10 to be packed within the package 1B is the pants-type disposable diaper 10 similar to that shown in Fig. 1. The packaged assembly according to this embodiment is distinguished from that of Fig. 1 in the arrangement as will be described.

[0032]

The opposite lateral portions of the crotch region's bottom 19 are folded along the first fold-guiding lines 30 inwardly of the diaper 10 and the waist's lateral portions 20 are folded along the second fold-guiding lines 32 inwardly of the diaper 10. The manner in which the crotch region's bottom 19 is folded is same as in the case of Fig. 3 and details thereof

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will not be described here again. As indicated by chain double-dashed lines in Fig. 7, second fold-guiding lines 32 extend immediately outside the transversely opposite side edges 15b of the core 15 in parallel to the longitudinal center line 33 bisecting the width dimension defined between the waist's lateral portions 20 so as to extend through these waist's lateral portions 20 also in the longitudinal direction.

[0033]

In this packaged assembly, the first diapers 10A packed within the package 1B with the waist-surrounding end portions 18 lying on the side of the top surface 2a relative to the crotch regions' bottoms 19 and the second diapers 10B packed within the package 1B with the waist-surrounding end portion 18 lying on the side of the bottom surface 2b relative to the crotch regions' bottoms 19 are alternately placed against one another in the back-and-forth direction (one direction). Within the package 1B, a total of ten diapers 10 placed one against another in the back-and-forth direction to form a row G in the manner similar to the case of the package 1A and two of such rows G placed side by side. Additional pair of such rows G placed side by side are stacked upon the former pair of the rows G. These diapers 10 are densely packed within the package 1B between the first and second surfaces 2c, 2d under a compression exerted

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in the back-and-forth direction. The row G is formed by five of the first diapers 10A and five of the second diapers 10B. Namely, the number of the first diapers 10A is equal to the number of the second diapers 10B in the row G. In the row G, from the front side toward the backside in the back-and-forth direction, the front waist region 16 of the second diaper 10B lying immediately behind the first diaper 10A is placed against the rear waist region 17 of this first diaper 10A and the front waist region 16 of the first diaper 10A lying immediately behind this second diaper is placed against the rear waist region 17 of this second diaper 10B.

[0034]

In the case of this packaged assembly also, the first diapers 10A and the second diapers 10B are alternately placed against one another and the number of the first diapers 10A is equal to the number of the second diapers 10B in the row G. Such construction of the row G advantageously ensures that the thickness of the row G in the back-and-forth direction has substantially no difference between its upper half and lower half. This embodiment is characterized in that not only the transversely opposite lateral portions of the crotch region's bottom 19 but also the waist's lateral portions 20 are folded inwardly of the diaper 10. In this way, the diaper 10 can be

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made further compact in comparison to the diaper 10 of Fig. 3 and thereby the diapers 10 can be more efficiently packed within the package 1B.

[0035]

In the case of the packaged assembly illustrated by Fig. 8, there is substantially no gap between each pair of the adjacent diapers 10 both in the upper half and in the lower half of the row G, so the stability required when a plurality of the packages 1B are stacked in the vertical direction is reliably ensured and there is no anxiety that a stack of the packages 1B might unintentionally collapse. In this packaged assembly, the first diapers 10 and the second diapers 10B are alternately placed against one another in the back-and-forth direction without leaving any gap and it is not apprehended that the waist-surrounding end portions 18 of the respective diapers 10 might be readily bent and the upper row G of the diapers 10 might flatten or collapse the waist-surrounding end portions 18 of the diapers 10 in the underlying row G.

[0036]

Figs. 8 and 9 are side views showing packages 1C, 1D according to two other embodiments of the invention as partially broken away. In Figs. 8 and 9, a forward direction as viewed in the back-and-forth direction is indicated by an arrow Y1,

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a backward direction as viewed in the back-and-forth direction is indicated by an arrow Y2 and a vertical direction is indicated by an arrow Z.

[0037]

Similarly to the package 1A shown in Fig. 1, the package 1C as well as the package 1D has a hexahedral shape which is relatively long in the back-and-forth direction and each pair of adjacent surfaces are substantially orthogonal to each other. The disposable diapers 10 to be packed therein are of pants-type. The packages 1C, 1D are adapted to contain therein the diapers 10 each having the transversely opposite lateral portions of the crotch region's bottom 19 folded along the first fold-guiding lines 30 inwardly of the diaper 10 as shown by Fig. 3 or the diapers 10 each having the transversely opposite lateral portions of the crotch region's bottom 19 folded along the first fold-guiding lines 30 inwardly of the diaper 10 and the waist's lateral portions 20 folded along the second fold-guiding lines 32 inwardly of the diaper 10 as shown by Fig. 6.

[0038]

In the case of the packaged assembly shown by Fig. 8, the package 1C contains therein a total of eleven diapers 10 placed against one another in the back-and-forth direction (one

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direction) in each row G. The row G is formed by five of the first diapers 10A and six of the second diapers 10B. In the row G, five of the first diapers 10A are serially arranged from the first lateral surface 2c to the longitudinally middle position of the package 1C and six of the second diapers 10B are serially arranged from the longitudinally middle position of the package 1C to the second lateral surface 2d. These diapers 10 are densely packed within the package 1C so as to placed against one another in the back-and-forth direction under a compression in this back-and-forth direction. Within the package 1C, each of the first diapers 10A has its waist-surrounding end portion 18 lying on the side of the top surface 2a of the package 1C relative to its crotch region's bottoms 19 and each of the second diapers 10B has its waist-surrounding end portions 18 lying on the side of the bottom surface 2b of the package 1C relative to its crotch region's bottom 19.

[0039]

The first diapers 10A are serially arranged from the first lateral surface 2c toward the longitudinally middle position of the package 1C in a manner that the front waist region 16 of the diaper 10 lying immediately behind the preceding diaper 10 is placed against the rear waist region 17 of this preceding

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diaper 10 and so on. The second diapers 10B are serially arranged from the longitudinally middle position of the package 1C in the same manner as the first diapers 10A.

[0040]

In the case of the packaged assembly illustrated by Fig. 8, the number of the second diapers 10B is more than the number of the first diaper 10A by one. In spite of this difference, there is substantially no difference between a thickness dimension of the row G in the back-and-forth direction on the side of the top surface 2a of the package 1C and a thickness dimension of the row G in the back-and-forth direction on the side of the bottom surface 2b of the package 1C and there is no gap between each pair of the adjacent diapers 10 both in the upper half and in the lower half of the row G. With an advantageous consequence, the diapers 10 can be packed within the package 1C with an improved efficiency. Furthermore, this packaged assembly ensures a high stability when a plurality of packages 1C are stacked in the vertical direction without any anxiety that the stack of the packages 1C might unintentionally collapse.

[0041]

In the case of the packaged assembly illustrated by Fig. 9, the package 1D contains therein a row G consisting of eighteen

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diapers 10 serially placed against one another in the back-and-forth direction (one direction). Specifically, these eighteen diapers 10 consist of nine of the first diapers 10A and nine of the second diapers 10B. In the row G, each set of three first diapers 10A and each set of three second diapers 10B are alternately appear and all of these first and second diapers 10A, 10B are densely packed within the package 1D between first and second lateral surfaces 2c, 2d of the package 1D under a compression exerted in the back-and-forth direction.

[0042]

Each of the first diapers 10A has its waist-surrounding end portion 18 lying on the side of the top surface 2a of the package 1D relative to its crotch region's bottom 19. Each of the second diapers 10B has its waist-surrounding end portion 18 lying on the bottom surface 2b of the package 1D relative to its crotch region's bottom 19. Among each set of three first diapers 10A, the front waist region 16 of the diaper 10A lying immediately behind the preceding diaper 10A is placed against the rear waist region 17 of the preceding diaper 10A and so on. Among each set of three second diapers 10B also, the front waist region 16 of the diaper 10B lying immediately behind the preceding diaper 10B is placed against the rear waist region 17 of the preceding diaper 10B and so on. As for relationship

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between the first and second diapers 10A, 10B, the front waist region 16 of the second diaper 10B is placed against the rear waist region 17 of the first diaper 10A.

[0043]

In the case of the packaged assembly illustrated by Fig. 9, the number of the first diapers 10A is equal to the number of the second diapers 10B and there is no difference in the thickness dimension of the grow G in the back-and-forth direction between on the side of the top surface 2a of the package 1d and on the side of the bottom surface 2b of the package 1d. Furthermore, there is substantially no gap between each pair of the adjacent diapers 10 both in the upper half and in the lower half of the row G, so the diapers 10 can be packed within the package 1d with an improved efficiency. This packaged assembly is effective to improve the stability required when a plurality of the packages 1d are stack in the vertical direction and thereby to prevent the anxiety that a stack of the packages 1d might unintentionally collapse.

[0044]

In the case of the packaged assembly illustrated by Fig. 9, it is also possible to alternately arrange a set of four or more first diapers 10A and a set of four or more second diapers 10B series so that the respective diapers may be placed against

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one another in the back-and-forth direction.

[0045]

In these embodiments of the packaged assembly having been described and illustrated, a difference between the number of the first diapers 10A and the number of the second diapers 10B is preferably in a range of 0 to ± 3 . In these embodiments of the packaged assembly, three or more rows G of the diapers 10 may be stacked in the vertical direction and three of such stack maybe arranged side by side. The diaper to be packed within these packages 1A, 1B, 1C, 1D may be also open-type diaper of which the front and rear waist regions are connected to each other along the waist's lateral portions 20. It should be understood here that the number of the diapers 10 to be packed within the packages 1A, 1B, 1C, 1D is not particularly specified.

[0046]

While the packages 1A, 1B, 1C, 1D have been described above on the basis of the assumption that the front surface is defined by the first lateral surface and the back-and-forth direction is defined by the direction extending from the first lateral surface 2c toward the second lateral surface 2d, it is also possible to assume the third lateral surface 23 as the front surface, to assume the direction extending from this third

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lateral surface 2e toward the fourth lateral surface 2f as the back-and-forth direction and to assume the direction extending from the first lateral surface 2c toward the second lateral surface 2d as the transverse direction. In this case, the diapers 10 are successively placed against one another from the third lateral surface 2e toward the fourth lateral surface 2f and the diapers 10 successively placed against one another between the third lateral surface 2e and the fourth lateral surface 2f form the row G. While the top surface 2a has been assumed as the first surface, the bottom surface 2b has been assumed as the second surface and the first through fourth lateral surfaces 2c, 2d, 2e, 2f have been assumed as the third through sixth surfaces, it is also possible to assume the first surface, the second surface, and the third through sixth surfaces as the top surface 2a, the bottom surface 2b, the third lateral surface 2e and the fourth lateral surface 2f, respectively. In this case, the diapers 10 will be stacked between the top surface 2a and the bottom surface 2b to form the row G.

[0047]

The package 1A, 1B, 1C, 1D may be formed using breathable but liquid-impervious plastic film or breathable but liquid-impervious fibrous nonwoven fabric.

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[0048]

The liquid-pervious sheet 13 may be formed using hydrophilic fibrous nonwoven fabric, hydrophobic fibrous nonwoven fabric having a plurality of fine pores or plastic film having a plurality of fine pores. The liquid-impervious sheet 14 may be formed using hydrophobic fibrous nonwoven fabric, breathable but liquid-impervious plastic film, composite nonwoven fabric consisting of two or more hydrophobic fibrous nonwoven fabric layers laminated one upon another or a composite sheet consisting of hydrophobic fibrous nonwoven fabric and breathable but liquid-impervious plastic film laminated upon each other. The outer sheet 12 may be formed using composite nonwoven fabric consisting of two or more hydrophobic fibrous nonwoven fabric layers laminated one upon another.

[0049]

The fibrous nonwoven fabric used herein may be selected from a group consisting of those obtained by spun lace process, needle punch process, melt blown process, thermal bond process, spun bond process, chemical bond process and air-through process. Component fiber of the nonwoven fabric may be selected from a group consisting of polyolefine-, polyester-, polyamide-based fibers and core-sheath type or side-by-side type conjugated fiber of polyethylene/polypropylene or

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polyethylene/polyester.

[0050]

The core 15 comprises a mixture of fluff pulp and super-absorbent polymer grains or a mixture of fluff pulp, super-absorbent polymer grains and thermoplastic synthetic resin fiber, in both cases, compressed to a desired thickness. Preferably, the core 15 is entirely wrapped with a liquid-pervious sheet such as tissue paper or hydrophilic fibrous nonwoven fabric in order to prevent the core 15 from getting out of its initial shape and/or to prevent the polymer grains from falling off. The polymer grains may be selected from a group consisting of starch-based polymer grains, cellulose-based polymer grains or synthetic polymer grains.

[0051]

Bonding of the sheets 13, 14 to each other, bonding of the core 15 to the sheets 13, 14 and bonding of the elastic members 29b to the sheets 13, 14 may be achieved by use of hot melt adhesive or welding means such as heat-sealing or ultrasonic sealing technique.

[0052]

[Effect of the Invention]

The packaged assembly according to this invention is primarily characterized in that a plurality of diapers

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comprising the first and second diapers, each having the crotch region' bottom folded inwardly of the diaper, are densely packed between the opposed surfaces with the package and substantially same number of first and second diapers are successively placed against one another so as to form a row. With the packaged assembly according to the present invention, there is no gap between each pair of the adjacent diapers both in the upper half and in the lower half of the row even when a plurality of diapers, each having a differential thickness dimension between the waist-surrounding end portion and the remaining portion, are packed to fill the maximum length of the package in one direction. In this way, the packing efficiency of the package for the diapers can be improved.

[0053]

With this packaged assembly, there is no gap left between each pair of the adjacent diapers both in upper half and in the lower half of the row and therefore a plurality of packages can be stably stacked in the vertical direction without the anxiety that the stack of packages might unintentionally collapse.

[0054]

In this packaged assembly, the first and second diapers are closely placed against one another in the back-and-forth direction without leaving any gap between each pair of the

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adjacent diapers and therefore, it is not apprehended that the waist-surrounding end portions of the diapers might be readily bent. Even when two or more rows are stacked in the vertical direction, there is no possibility that the overlying row of the diapers might flatten or collapse the waist-surrounding end portions of the diapers in the underlying row and consequently form the waist-surrounding end portions of the diapers in the underlying row(s) with a plurality of irregular wrinkles.

[0055]

The packaged assembly in which not only the both lateral portions of the crotch regions' bottoms but also the waist-surrounding end portions of the first diapers as well as the second diapers are folded inwardly of the diapers when packed within the package further improves the packing efficiency of the package for the diapers.

[0056]

With the packaged assembly in a difference between the number of the first diapers and the number of the second diapers is ± 3 or less, there is left substantially no gap between each pair of the adjacent diapers both in the upper half and in the lower half of the row even the number of the first diapers and the number of the second diapers in the row are different from each other. In this way, it is possible to achieve the same

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effect as the case in which the number of the first diapers and the number of the second diapers are equal to each other.

[Brief Description of the Drawings]

[FIG. 1]

Fig. 1 is a perspective view showing a package as partially broken away.

[FIG. 2]

Fig. 2 is a side view showing the package as the diapers packed therein are exposed.

[FIG. 3]

Fig. 3 is a perspective view showing the single diaper taken out from the package.

[FIG. 4]

Fig. 4 is a developed plan view showing the diaper of Fig. 3.

[FIG. 5]

Fig. 5 is a perspective view showing another embodiment of the package as partially broken away.

[Fig. 6]

Fig. 6 is a perspective view showing the single diaper taken out from the package of Fig. 5.

[Fig. 7]

Fig. 7 is a developed plan view showing the diaper of Fig.

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6.

[Fig. 8]

Fig. 8 is a side view showing still another embodiment of the package as partially broken away to expose the diapers packed therein.

[Fig. 9]

Fig. 9 is a side view showing further another embodiment of the package as partially broken away to expose the diapers packed therein.

[Identification of Reference Numerals Used in the Drawings]

- 1A package
- 1B package
- 1C package
- 1D package
- 2a top surface (first surface)
- 2b bottom surface (second surface)
- 10 disposable diaper
- 10A first diaper
- 10B second diaper
- 11 liquid-absorbent panel
- 12 outer sheet (liquid-impervious backsheet)
- 13 liquid-pervious sheet (liquid-pervious topsheet)
- 14 liquid-impervious sheet (liquid-impervious backsheet)

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- 15a longitudinally opposite ends
- 15b transversely opposite side edges
- 16 front waist region
- 17 rear waist region
- 18 waist-surrounding end portions
- 19 crotch region's bottom
- 20 waist's lateral portions
- 21 leg-surrounding lateral portions
- 23 waist-hole
- 24 leg-holes
- 30 first fold-guiding lines
- 32 second fold-guiding lines
- 33 longitudinal center line
- G rows
- G group

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[Name of Document] ABSTRACT

[Contents of the Abstract]

[Object] This invention aims to provide a packaged assembly consisting of a package and a plurality of disposable diapers packed therein improved so that the disposable diapers can be efficiently packed within the package and two or more packaged assemblies can be stably stacked in vertical direction without the anxiety of unintentional collapsing.

[Measure to Achieve the Object] Here is disclosed a packaged assembly comprising a package 1A formed of a flexible sheet substantially in a regular hexahedron of which each pair of adjacent surfaces are substantially orthogonal to each other and a plurality of disposable diapers 10 each comprising front and rear waist regions 16, 17 opposed to each other, waist-surrounding lateral portions 18 destined to surround a waist-hole 18 and a crotch region's bottom 19 lying below a pair of leg-holes 24. These diapers 10 are densely packed with the front and rear regions thereof placed against one another in back-and-forth direction. Within the package 1A, the first diapers 10A have the waist-surrounding end portions 18 lying on the side of a top surface 2a of the package 1A and the second diapers 10B having the waist-surrounding end portions 18 lying on the side of a bottom surface 2b of the package 1A. Both

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lateral portions of the crotch regions' bottoms of the first and second diapers 10A, 10B are folded inwardly of the respective diapers 10. In a row G formed by the diapers 10 placed against one another in a back-and-forth direction, the number of the first diapers 10A and the number of the second diapers 10B are substantially equal to each other.

[Reference Drawing]

Fig. 1